



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/840,090	05/06/2004	Keith T. Carron	UW-2	7838
28581	7590	03/25/2009		
DUANE MORRIS LLP - Princeton			EXAMINER	
PO BOX 5203			MUI, CHRISTINE T	
PRINCETON, NJ 08543-5203			ART UNIT	PAPER NUMBER
			1797	
			MAIL DATE	DELIVERY MODE
			03/25/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/840,090

Applicant(s)

CARRON ET AL.

Examiner

CHRISTINE T. MUI

Art Unit

1797

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11-34 is/are pending in the application.
- 4a) Of the above claim(s) 18-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 30 January 2009 has been entered.

Response to Arguments

Applicant's arguments, see REMARKS, filed 30 January 2009, with respect to the rejection(s) of claim(s) 1-17 under 35 USC 102(b) and 35 USC 103(a) have been fully considered and are persuasive. Examiner has recognized the difference between the instant application and the exposure to the metal surface and the exposure to a coated metal surface to an analyte that enhances SERS active surfaces to capture analytes of interest.

Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of US Publication No. 2003/0231304 to Chan et al.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1-9 and 11-17 are rejected under 35 U.S.C. 102(a) as being anticipated by US Publication No. 2003/0231304 to Chan et al (herein referred 'Chan').

4. Regarding claims 1-9 and 11-17, the reference Chan discloses a method and an apparatus for Raman spectroscopy using metal coated nanocrystalline porous silicon substrates. The porous silicon substrates may be formed by anodic etching in dilute hydrofluoric acid and a thin coating of a Raman active metal, such as gold, silver, platinum, copper or aluminum, may be coated onto the porous silicon by cathode electromigration or any known technique, such as electroplating, cathodic electromigration, evaporation and sputtering of metals, using seed crystals to catalyze plating, ion implantation, diffusion, or any other known methods. The composition and/or thickness of the metal layer may be controlled to optimize the plasmon resonance frequency of the metal coated porous silicon. In another embodiment, the metal coating may comprise of nanocrystalline, porous silicon substrate, with immobilized metal colloids, such as silver or gold nanoparticles, coated on a different type of substrate, an/or immobilized metal colloids coated on top of a metal coated nanocrystalline, porous silicon substrate; which would have a very high density Raman

active metal, with relatively small channels for analytes in solution to enter the substrate. The metal-coated substrate provides extensive metal rich environment for SERS, SERRS, hyper-Raman and/or CAARS Raman spectroscopy. The metal-coated substrate is also used to further enhance the Raman signal and may be used to detect or identify and/or quantify a wide variety of analytes. Crystal composition and porosity may be regulated to change the optical property of the properties of the porous silicon in order to enhance the Raman signals and decrease the background noise. The nanoparticles are Raman active nanoparticles such as metal gold or silver particles, to further enhance the Raman signal. The nanoparticles may vary on size and may be added to the metal coating of the porous substrate. The diameter of the nanoparticles depends on the pores in the porous silicon and may be selected so that the nanoparticles may be able to fit inside of the pores. The nanoparticles may be random aggregates of nanoparticles (colloidal nanoparticles) or may be cross-linked to produce particular aggregates. The nanoparticles may also be connected to a linker compound to provide dimers, trimers or other aggregates.

5. In certain embodiments of the Raman porous substrate, a label may be attached to one or more analytes to facilitate the measurement by the Raman detection unit, which may be for example 6-carboxytetramethyl amino phthalocyanines, cyanines or cyanide. The labels may be directly attached to the analyte or may be attached via various linker compounds.

6. The analytes may be detected or identified by any known method of Raman spectroscopy and the active substrate may be operably coupled to one or more Raman

detection units, once the substrate is placed in a flow through cell connected to an inlet, and an outlet channel, where there is a sample injector. The sensitivity of the Raman detection is enhanced by a factor of 106 or more for molecules adsorbed on roughened metal surfaces such as silver, gold, platinum, copper or aluminum surfaces. The Raman detection unit comprises an excitation beam that is generated by either a frequency doubled Nd:YAG laser or a frequency doubled Ti:sapphire laser. The excitation beam is passed through a confocal optics and a microscope objective, and then focused onto the Raman active substrate containing one or more analytes. The Raman emission light from the analytes are then collected by the microscope objective and the confocal optics and is coupled to a monochromator for spectral dissociation. The Raman emission signal is detected by the Raman detector, comprising an avalanche photodiode interfaced with a computer for counting and digitization of the signal (see abstract, [0009-0011, 0025-0027, 0033-0041, 0050-0059, Examples 1 and 2).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTINE T. MUI whose telephone number is (571)270-3243. The examiner can normally be reached on Monday-Thursday 7-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on (571) 272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CTM

/Walter D. Griffin/
Supervisory Patent Examiner, Art Unit 1797